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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,835	03/17/2005	Jason Daniel Harold O'Connor	2135-00500	2402

23505 7590 03/20/2006

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EXAMINER
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RALIS, STEPHEN J

ART UNIT	PAPER NUMBER
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3742

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary****Application No.**

10/521,835

**Applicant(s)**O'CONNOR, JASON DANIEL  
HAROLD**Examiner**

Stephen J. Ralis

**Art Unit**

3742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/19/2005 & 4/15/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority benefit of United Kingdom Application No. 0216932.4, filed 20 July 2002.

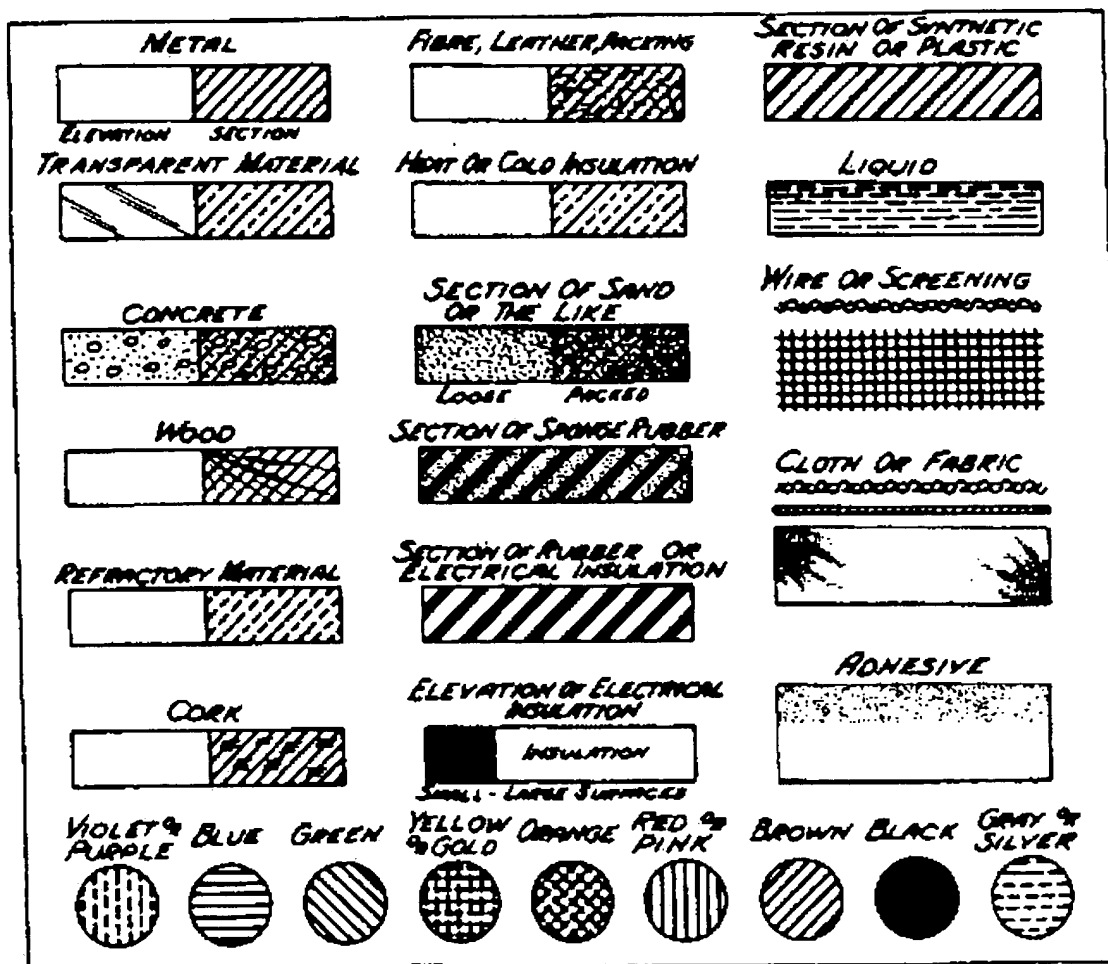
### ***Drawings***

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the cross hatching for the disclosed invention are incorrect.

Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

The following hatching symbols should be used to indicate various materials in cross-section. The use of such hatching is also very helpful in prior art searches.

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Figures 3 and 4: Most materials are currently hatched for metal, which is improper. All insulation materials (e.g. PTC sheath, 4; insulation sheath, 3; etc.) must be hatched in accordance with proper hatching symbols above.

### Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Electric Heating Cable with Positive Temperature Coefficient Sheath for Control of Power".

***Claim Objections***

4. Claim 3 and 4 are objected to because of the following informalities: In claim 3, line 4, "heating wire round around" should read –heating wire wound around–.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim.

***Claim Rejections - 35 USC § 102***

7. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnson et al. (U.S. Patent No. 4,117,312).

Johnson et al. disclose an electric heating cable comprising: at least two power conductors 10, 12 extending along the length of the cable C and at least one heating element 38 which extends along the cable and between the two conductors (10, 12), and connected in parallel between the conductors (i.e. heating material 38 continuously connected to conductors 10, 12), wherein at least one of the conductors is encased in a sheath 36 of material which has a temperature of coefficient of resistance material (i.e.

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layer 36 is coated on at least one of the conductors 10, 12, column 4, lines 25-38; see Figure 4; note: Figure 3 shows insulation jacket with slits 20, 22 and temperature of coefficient of resistance material 18 within the slits 20 between the conductor 10 and heating element 16; Figure 6 shows that insulation layers 58, 60 can partially or completely encase the conductors); and the heating element 38 electrically contacts the outer surface of the sheath 36 (column 4, lines 25-38; see Figure 4) such that the sheath is electrically connected in series between each heating element and the conductor encased by the sheath (column 4, lines 30-35); wherein the heating element 38 comprises a semi-conductor (i.e. thermoplastic material having graphite particles deposited within; column 8, claim 14). As the reference meets all material limitations of the claims at hand, the reference is anticipatory.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Patent No. 4,117,312).

The claims differ from Johnson et al. in calling for the heating element comprising a heating wire instead of a continuously heating material.

Johnson et al. disclose that Figure 3 (i.e. heating element comprising heating wire) is an equivalent structure known in the art with respect to Figure 4 (i.e. continuously heating material 38). Johnson et al. also disclose a heating wire 16, which extends along the cable and between the two conductors 10, 12, so as to define a series of heating elements connected in parallel between the conductor. Johnson et al. further disclose a temperature sensitive variable resistance material 18 connected to conductor 10 similarly as the coating layer 36. Therefore because these two heating elements were art recognized equivalents at the time of the invention was made and manufacturing of resistance wire elements is more cost effective than the process of a heating element material, one of ordinary skill in the art would have found it obvious to substitute the heating wire 16 for the heating material 38.

11. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heizer (U.S. Patent No. 6,144,018) in view of Johnson et al. (U.S. Patent No. 4,117,312).

Heizer discloses an electric heating cable comprising: at least two power conductors 1 extending along the length of the cable and at least one heating element

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(i.e. heating wire 5/8) which extends along the cable and between the two conductors 1 encased in an insulation sheaths 2 and connected in parallel between the conductors (via alternating openings 4 along the length of the cable; column 3, lines 56-60).

The claims differ from Heizer in calling for at least one of the conductors is encased in a sheath of material which has a positive temperature coefficient and the heating element electrically contacts the outer surface of the sheath such that the sheath is electrically connected in series between each heating element and the conductor encased by the sheath.

Johnson et al. teach an electric heating cable comprising: at least two power conductors 10, 12 extending along the length of the cable C and at least one heating element 38 which extends along the cable and between the two conductors (10, 12), and connected in parallel between the conductors (i.e. heating material 38 continuously connected to conductors 10, 12), wherein at least one of the conductors is encased in a sheath of material which has a temperature of coefficient of resistance material (i.e. layer 36 is coated on at least one of the conductors 10, 12, column 4, lines 25-38; see Figure 4; note: Figure 3 shows insulation jacket with slits 20, 22 and temperature of coefficient of resistance material 18 within the slits 20 between the conductor 10 and heating element 16; Figure 6 clearly shows that insulation layers 58, 60 can partially or completely encase the conductors and Johnson et al. clearly state that the size and shape of the disclosure do not limit the invention; column 5, lines 49-54) and the heating element 38 is in electrical contact with the outer surface of the sheath 36 (column 4, lines 25-38; see Figure 4) such that the sheath is electrically connected in series



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between each heating element and the conductor encased by the sheath (column 4, lines 30-35). Johnson also teaches slits 20, 22 in insulation jackets 24 wherein the electric conductors are exposed, however, is specific with respect the conductor 10 incorporating the temperature of coefficient of resistance material 18 not being in direct contact with the heating wire 16 (column 2, lines 27-68; column 3, lines 1-9; see Figure 3). Johnson et al. further teach that the inclusion of said temperature of coefficient of resistance material decreases the flow of current in response to the increased resistance (i.e. upon heating up of the cable), limiting power output from the cable, preventing the overheating of the heating cable (column 1, lines 28-50) thereby, increasing the overall safety of the device. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify at least one of the insulation sheaths of the Heizer heating cable with the temperature of coefficient of resistance material sheath of Johnson et al. to decrease the flow of current in response to the increased resistance, limiting power output from the cable, preventing the overheating of the heating cable (column 1, lines 28-50) thereby, increasing the overall safety of the device.

Heizer further discloses the first conductor 1 encased in an insulation sheath 2; a third sheath (i.e. insulator coat 3) encasing the first and second sheaths; portions of the third sheath being removed to cause the heating wire to contact the second sheath; the first sheath being in contract with the second sheath (see Figure 2); and portions of the first and third sheaths removed to cause the heating wire to contact the first conductor (column 3, lines 50-67, column 4, lines 1-2).

***Prior Art***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 4,037,083 to Leavines is a teaching of an electric heating cable with opening creating parallel heating structure.

U.S. Patent No. 4,523,086 to Eilentropp is a teaching of a flexible electrical heating element with opening to make electrical contact.

U.S. Patent No. 3,757,086 to Indoe is another teaching of a flexible electrical heating element with opening to make electrical contact.

U.S. Patent No. 4,314,145 to Horsma is a teaching of an electrical heating element with a two conductors, one being encased in a PTC material.

U.S. Patent No. 4,954,695 to Smith-Johannsen et al. is a teaching of a heating element utilizing semi-conductive material for heating.

U.S. Patent No. 5,095,938 to Brown is another teaching a heating element utilizing semi-conductive material for heating.

U.S. Patent No. 4,459,473; 4,659,913; 4,721,848; 4,937,435; 5,512,732; 6,005,232"; European Patent No. 1199727 A2; 0809417 A2; and United Kingdom Patent No. 2168580 A are cumulative to or less pertinent than the references relied upon above.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

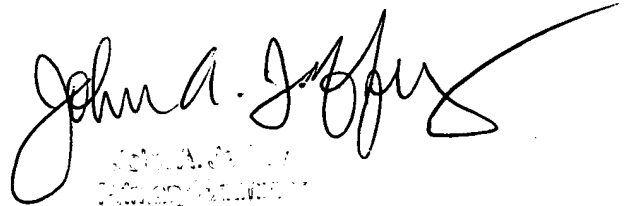
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Stephen J Ralis  
Examiner  
Art Unit 3742

SJR  
March 7, 2006



John A. Jeffers  
Patent Examiner